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THE
LARYNGOSCOPE.

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PENICILLIN—CLINICAL USE IN OTOLARYNGOLOGY.*

J. WINSTON FOWLKES, M.D.,
New York, N. Y.

By the discovery and use of penicillin in the treatment of infections we have passed another important milestone in our fight against bacteria.

Fleming, of London, in 1928, noticed that certain bacteria were inhibited in their growth by contamination from the air. In 1929, he discovered that the mold penicillium notatum gave off substances which produced lysis in staphylococcal colonies. Little practical application or interest was shown in this discovery until 1939, when Dubos published reports on the antibacterial effect of an extract of a soil bacillus against Gram-positive cocci. These reports stimulated interest again in finding some antibacterial agent of biologic origin and gave investigators another clue to substances such as penicillin which perhaps could be used in therapeutics.

From a practical standpoint, Dr. Florey, of England, first used the drug in treatment of patients. At first only moribund patients were turned over to him for clinical trial. The results were so striking that he came to this country in 1941 to introduce his findings and to find some way by which the drug could be made in sufficient quantities to give more thorough clinical trial. This was accomplished through our National Research Council.

*Read at the meeting of the New York Academy of Medicine, Section on Otolaryngology, New York, N. Y., Jan. 17, 1945.

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Chemistry: Penicillin is an organic acid which reacts chemically to form salts and esters. The sodium salt is generally used because of its availability now, but the calcium salt probably will become the one of choice as it is more stable and equally effective. The exact chemical formula is not as yet known; therefore, a synthetic preparation has not been produced.

It is thought that the formula is $C_{14}H_{19}NO_6$ or $C_{14}H_{17}NO_5+H_{20}$; however, this is not of particular importance to us just now, as this paper is not intended to deal with the chemistry of the drug.

Action: It is an established fact that its action is bacteriostatic, and some workers have shown it to be bacteriocidal when used in highly concentrated solutions. It is sometimes difficult and not practical to determine the concentration; therefore, in the average case its action is probably bacteriostatic. For this reason alone it is essential to continue the drug until recovery is well established. Although the limit of its action is not yet determined, most of us already realize that it is selective in its action, *i.e.,* it is more effective on aerobic and anaerobic Gram-positive bacteria. In our particular field it is interesting to note that the rule is violated, in regard to the meningococcus and micrococcus catarrhalis which are both Gram-negative but are among the most sensitive organisms to penicillin. Another important feature is that its action is exerted on tissue bacteria without causing destruction to the cells of the host. This is in contrast to chemical antiseptics which act as a protoplasmic poison.

Administration and Dosage: The question soon arose as to how to establish a unit of quantity for a standardized dose. This was solved by using the amount of penicillin which was required to produce lysis in a certain size area of colonies of a known strain of staphylococcus, and this amount was called an Oxford Unit.

The exact dosage has not as yet been established for different infections. It was not until recently that a standardized method was developed for measuring the amount of the drug in the blood at any given time. This is accomplished now by obtaining the reaction of the blood serum to known strains of bacteria. The point at which lysis takes place is considered an adequate concentration.

Since 58 per cent of the drug is excreted by the kidneys in an hour, it is essential that frequent doses be given to maintain a sufficient blood level. This blood level can be maintained by intravenous or intramuscular injections and sometimes supplementing this with local applications in closed wounds. The intramuscular method of administration is preferable because the drug is absorbed more slowly, therefore remaining in effective amounts in the blood stream longer, 10,000 to 20,000 units every three hours being the usual dose.

In extreme cases in which it is considered imperative to get the effect of the drug as quickly as possible, it may be given intravenously at the rate of 30,000 to 40,000 units in 24 hours.

When surgery is imminent, I would like to recommend preoperative administration of penicillin whenever possible, as the postoperative course is much less hazardous and the time of convalescence greatly reduced.

Absorption, Excretion and Distribution in the Body: Penicillin when administered intravenously or intramuscularly is quickly absorbed into the blood, but only a small proportion stays in the blood or tissues. About 60 per cent can be recovered from the urine one hour after its injection. This penicillin which is recovered is not broken down or changed in any way, and after its recovery from the urine it has even been used again with equally beneficial results.

Some of the remaining 40 per cent is taken up by the liver and excreted in the bile, also a small amount has been found in the saliva. From these two sources the penicillin is evidently mostly broken down, as penicillin is inactivated by the gastric juice, and the bacterial flora of the large intestine; however, no penicillin has ever been recovered from the spinal fluid or tears when administered intravenously. In view of this fact, it is evident that in treating meningitis the penicillin must be injected directly into the spinal column or the cisterna magna. It is also excreted very slowly when given in this manner; therefore, two doses in 24 hours has been found to be sufficient to obtain desired results.

Toxicity as Compared with the Sulfatherapy: When the drug is pure and the salt or dextrose solutions used are pyro-

gen-free, no serious effects have been noted. In the few cases that did show toxic effects, these effects were not severe; all were transitory and disappeared as soon as the drug was discontinued. In our work at St. Luke's we have also noticed that after discontinuing the drug for two days it could be readministered in smaller doses to these same patients without any reappearance of untoward symptoms. The toxic effects reported are: flushing of the face, tingling of the testes, headache, urticaria, arthralgia, fever, sore throat and enlarged lymph glands and spleen. We have noted only a few of these symptoms, as in our cases the patients have been unusually free of toxic effects.

As compared with the sulfa compounds, we have found that penicillin is tolerated by a much higher percentage of patients and without constant fear of anuria which may be produced by the crystallization of the sulfa in the kidneys. The very high temperature and chill so often produced by the sulfa compounds is often very confusing. I have not noted this in our patients treated with penicillin alone. Many patients who were apparently unaffected by the sulfa compounds respond beautifully to penicillin.

I do not think we can evaluate the efficacy of a drug unless we familiarize ourselves with its common reactions and the behavior of the patients.

In the literature we find many theories and divergencies of opinion regarding the action of penicillin on different infections. For this reason I am reporting some of the cases treated with penicillin at St. Luke's Hospital.

We must remember that most of these cases were given sulfadiazine before penicillin was used. In this we were abiding by government regulations. Our supply of penicillin has been very meager, and I do not feel that we should draw any definite conclusions since our cases have been necessarily selected and limited.

In these cases the results have been very gratifying, and it will be interesting to follow larger groups in the future.

In considering the dosage of this drug it is well to know just what we mean by the so-called Oxford Unit (Dr. Florey).

The dose of penicillin is not considered in grains or grams. A unit is the amount of penicillin required to produce a clear zone in agar media, 24 mm. in diameter, after the media has been seeded with a standard test strain of staphylococcus.

It is always important to know whether or not a given organism, which is causing an infection, is sensitive to penicillin.

It was not until recently that we at St. Luke's were prepared to determine the penicillin level. This is arrived at in the following manner: The determination is made from the patient's blood serum as indicated. We use a test strain of streptococcus as a standard, whereas in some other hospitals a known strain of staphylococcus is used.

Case 1: Pneumococcus Type III Mastoiditis. N. L., a 39-year-old white, single woman, had a myringotomy (right) on July 2, 1944, because of an acute otitis media of one day's duration, accompanied by a heavily suppurative right maxillary and sphenoid sinusitis. She subsequently had three sinus irrigations with improvement to a clear return in one week; however, the ear continued to drain but seemed to be resolving. On July 10, eight days after the myringotomy, she suddenly developed chilly sensations and "aching all over" and was admitted to the medical service with a temperature of 104° and a W. B. C. of 23,000 with 86 per cent polys. The history, fever and blood picture were entirely out of proportion to the appearance of the infection in the ear but could not be accounted for on any other basis. When seen by the ear, nose and throat resident two days later, a mastoiditis masked by sulfadiazine was suspected; a pneumococcus type III infection being considered on the grounds of a rather mild looking eardrum with such marked systemic reaction, but a hemolytic staphylococcus aureus was obtained in the ear culture. X-ray showed a uniform haze throughout the right mastoid without bony involvement. There was an apparent resolution of the whole process on one week's treatment with sulfadiazine, and the patient was discharged from the hospital.

For one week after discharge a vague, mild throbbing sensation persisted in the right ear, but there was no pain; then drainage reappeared and she was again admitted to the hospital. This time the temperature was 100.2°. The drum was red and full and discharging profusely. There was right mastoid tenderness and a rotary nystagmus to the right. The X-ray now showed some loss of bony detail. A simple mastoidectomy was done, finding a creamy exudate throughout with the breakdown of bony septa. Pneumococcus type III was obtained in culture. The postoperative course was satisfactory, and she was discharged in 19 days with a very slight drainage from the posterior wound which was almost completely healed. The eardrum and canal were dry.

This posterior discharge was almost negligible for three weeks and then increased. It was a thin, straw-colored material from which pneumococcus type III was again cultured, according to the report of her private physician. The patient was readmitted with the drum still completely negative, but in the hospital only a staphylococcus albus could be obtained from the postauricular drainage. She was on penicillin three days but it was discontinued because of a severe papillary rash with itching. It was tried again on the seventh day with the same skin effect. She finally received it the eleventh and twelfth days with a changed brand

of penicillin and a reduction of the dosage from 20,000 units every three hours to 10,000 units. The drainage ceased and the wound healed completely. She was discharged on Sept. 19, and has had no recurrence since.

During her last admission two transfusions of 250 cc. of blood were given on successive days, as an adjunct to the penicillin therapy, because of her 70 per cent hemoglobin.

Points to Be Considered: 1. Culture at the time of myringotomy differed from that found in the mastoid. *2.* Atypical signs and symptoms in pneumococcus type III infections, also masked by sulfa and did not respond to the sulfa. *3.* The penicillin produced an allergic reaction, but when given in smaller doses it was tolerated, and good results were obtained.

The temperature chart showed that this patient did not tolerate the drug very well and that the drug did not produce the desired results. It was stopped in two instances when urticaria developed. After waiting several days, it was given in much smaller doses which the patient tolerated, and the temperature returned to normal. It also shows that the size of the dose plays an important rôle and must be determined by our best judgment of the case at hand.

Case 2: Frontoethmoid Sinusitis: H. M., a 49-year-old white woman, was admitted to St. Luke's Hospital, Sept. 15, with a history of having undergone an external frontal operation 16 years ago, at which time she claimed there was an abscess of the brain. She was asymptomatic until two or three years ago when she suffered from nasal discharge, obstruction and some swelling around the inner canthus of the right eye.

On examinationa painful right supraorbital swelling was found, which she said had been developing for two to three days. This was a large, round, hot, tender, fluctuant swelling, reaching as far up as the hair line, and her right eye was closed. There was no fixation of the eyeball.

The patient, a Christian Scientist, refused to be operated at this time, although she did admit that she had severe headache.

There was very little pus in the nose at the time. After 24 hours on sulfadiazine a continuous intravenous drip of penicillin was started and was maintained for four days, totaling 850,000 units by this route. She then was kept on 20,000 units intramuscularly every three hours for nine days. The swelling decreased for a few days and then remained stationary. A small sinus tract developed in the scar of the former operation and pus exuded through this.

On the fourteenth day after admission to the hospital, the patient gave her consent for operation. On the same day a bilateral Killian operation was done, with removal of the anterior plate and floor of both frontal sinuses and the right supraorbital ridge. All of the sinuses were found to be filled with polypi and purulent exudate. The frontals and ethmoids were exenterated bilaterally, involving an exposure of the dura over the left orbit, and the right supraorbital ridge was removed. The incisions were closed loosely with interrupted sutures and were allowed to heal under continuous wet dressings. The wound was flushed once a day with a solution containing 500 units per cc. of penicillin.

She was maintained on penicillin, 20,000 units intramuscularly every three hours for 17 days; 15,000 units every three hours for four days, and then 10,000 units every three hours for four days.

This wound remained unusually clean, and her postoperative course was uneventful.

Although the patient refused operation in the beginning, the preoperative administration of penicillin, I believe, stood her in good stead.

X-ray of the nasal sinuses, taken on the day of admission, showed very extensive pansinusitis with particularly advanced pathology of the frontals.

X-ray of same patient taken eight days later, Sept. 23, 1944, showed little change in condition but more extensive breaking down of the bony septum and more extension to left side. This was several days before the patient gave her consent for operation.

The third X-ray was made 18 days after a double radical Killian operation. Right supraorbital ridge, the septum between the two frontals and a portion of the inner plate on the left side had been removed.

Case 3: Ludwig's Angina. W. P., 35-year-old white man, had an incision and drainage of a tooth root abscess on Sept. 13, 1944. During the next two days he developed progressive swelling of the floor of the mouth and came to the hospital complaining of local pain, general malaise and inability to swallow. He was admitted to the surgical service with a temperature of 102.6°, pulse 124 and respiration 24. He had a taut, indurated swelling of the submental area down to the level of the larynx and laterally to each sternocleidomastoid muscle. The swelling in the floor of the mouth pressed his tongue up to the palate and back almost to the posterior pharyngeal wall. He was immediately given 2.5 mm. of sulfadiazine intravenously and then transferred to the ear, nose and throat service, where incision and drainage was done. There was a large abscess just superior to the right myelohyoid muscle, from which great quantities of heavy, gray, malodorous pus was pouring, culture of which revealed hemolytic staphylococcus aureus. Postoperatively, patient received a total of 500 cc. of plasma and 500 cc. of blood. A continuous intravenous drip of penicillin was started immediately after operation and within 36 hours he received 400,000 units. For the next five days he received 20,000 units intramuscularly every three hours and then, for four days, 10,000 units every three hours, totaling approximately 1,500,000 units.

A wet dressing was maintained on the incised area. There was copious drainage for about a week, then rapid improvement. He was discharged 15 days after admission.

This patient was dangerously ill and I think he recovered in about half the time required for this type of case before the use of penicillin.

Temperature chart showed the rapid return of the patient's temperature to normal the third day after incision and drainage. This man was extremely toxic and one would expect to find the postoperative course more uncertain.

Case 4: Double Caldwell-Luc. G. M., a white woman, 50 years of age, admitted to St. Luke's Hospital, Sept. 18, 1944, with a history of nasal stenosis and asthma over many years, and two attacks of pneumonia within the last year.

Several weeks prior to admission the asthma became more severe but was relieved by irrigation of the maxillary sinuses. X-rays of her nasal sinuses showed marked clouding and thickening of the lining membrane in both antra.

Previous cultures from the antral washings revealed a streptococcus type VIII, which was the same organism obtained at her two previous attacks of pneumonia. Her general physical and other history was of no special importance.

A double Caldwell-Luc was done Sept. 19, 1944. A small amount of free pus was found in each antra; the mucous membrane was polypoid and very much thickened in each side.

Penicillin was administered, 20,000 units intramuscularly every three hours, for 24 hours before operation.

The culture taken from the antra at the time of operation revealed a hemolytic staphylococcus aureus and a nonhemolytic streptococcus from both antra; all were penicillin-sensitive.

There was a marked reduction in the amount of secretion from the nose as compared with other cases, and the patient made an uneventful recovery with no return of asthmatic symptoms.

The penicillin was continued for 10 days postoperatively.

Temperature chart showed very little postoperative reaction, being normal on the fourth day and remaining so during the rest of her stay in the hospital.

Case 5: Mastoiditis. G. G., a 49-year-old white woman, entered St. Luke's Hospital, Dec. 7, 1944. Four weeks previous to date of admission she had a myringotomy on the right ear, for acute otitis media. Pus and blood under pressure were noted at the time. One gram of sulfadiazine was administered every four hours over a period of a week.

A copious discharge of pus continued for the first two weeks and then a small amount of pus each day for the following two weeks. Patient was unable to sleep and suffered general malaise and pain in the right side of her head. She also gave a history of having had sinusitis and chronic bronchitis for many years. Her sinuses had been operated and appeared in fairly good condition at this time.

X-ray examination of the mastoids showed marked clouding of the right mastoid. The septa were broken down with a far forward lateral sinus. At the time of operation, the mastoid was found to be very small; pus and granulations throughout and softening of the bone over the lateral sinuses and middle fossae. This bone was removed in both places.

Cultures taken from the mastoid cavity at the time of operation revealed a growth of staphylococcus albus.

Five days after operation, the drain was removed from middle ear, which was found to be dry. The next day the drain was removed from the mastoid wound. The drainage at this time was exceedingly meager and the wound was entirely healed in 14 days.

Beginning 24 hours before operation, 20,000 units of penicillin were administered intramuscularly every three hours for 10 days.

Temperature chart shows that the temperature did not go over 100° after operation, and on the third day postoperatively it was within normal limits and remained so. The patient had practically no postoperative discomfort and made a quick, uneventful recovery.

Case 6: Caldwell-Luc. M. R., a 35-year-old white man, was admitted to St. Luke's Hospital, Dec. 8, 1944. He had recently been discharged from the Coast Guard service. He gave a history of profuse nasal discharge and stenosis of three years' duration. He was found to be perfect

physically with the exception of his nasal condition. X-rays of his sinuses revealed a pansinusitis, more extensive on the right side. On irrigation of his antra, the left was found to be negative, but a large amount of broken down pus with odor was obtained from the right side. After several irrigations there was no improvement in his condition.

A Caldwell-Luc was done on the right side and a transantral ethmoidectomy. A large amount of pus and polypoid tissue was found in the antrum and ethmoid regions at the time of operation.

Cultures taken from the antrum at the time of operation showed a pure growth of streptococcus viridans.

This patient was given 20,000 units of penicillin every three hours intramuscularly for three days before operation, and for five days postoperatively.

His nasal condition cleaned up within three days after operation and there was practically no secretion after the packing was removed.

Temperature chart showed that this patient was running a mild septic temperature before operation. Two days after operation, his temperature was normal and remained so.

Again, I would like to repeat that whenever possible penicillin should be administered before operation as it seems to have a very beneficial effect on the patient's postoperative course in every respect.

12 East 63rd Street.

THE AMERICAL LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY, INC.

The Annual Meeting of the Triological Society will be held at The Drake in Chicago on Monday and Tuesday, May 28 and 29, 1945. Annual meetings of the American Laryngological Association, the American Broncho-Esophagological Association and the American Otological Society, Inc., will continue for the remainder of the week.

Due to the exceptionally heavy demand for guest rooms, it is necessary to make reservations as far in advance as possible. Please advise the hotel the time and date of departure.

DIZZINESS OF PERIPHERAL VESTIBULAR ORIGIN.*

FRANZ ALTMANN, M.D.,
New York, N. Y.

Peripheral vestibular or labyrinthine vertigo is almost invariably a typical turning vertigo, accompanied by the sensation of pseudo-movements. It is associated with nausea, frequently terminating in vomiting and with general vasomotor symptoms such as pallor and cold sweat. It is accompanied by nystagmus and as a rule, but not necessarily, is preceded by or combined with hearing disturbances. When the latter are absent, it may become very difficult to prove the peripheral origin of the vertigo.

In many cases with this type of dizziness the underlying disease is diagnosed without difficulties; inflammatory, neoplastic, post-traumatic or toxic-degenerative changes within the labyrinth or the VIIIth nerve being the most frequent cause.

Certain cases when fully developed show a triad of symptoms consisting of repeated attacks of labyrinthine dizziness, reduced hearing and, in most instances, tinnitus without any active disease of the middle ear and without any medical or neurological abnormalities. The attacks of dizziness are characteristically paroxysmal. The intervals between the attacks are of various length and during these periods the vestibular symptoms disappear usually completely; only reduced hearing and, frequently the tinnitus, persists. In some cases only one ear is affected; in others, both. The affection lasts for many years, sometimes throughout life. The dizzy spells disappear eventually in many instances, but the hearing loss is progressive and may even lead to complete deafness. The tinnitus persists frequently for a very long time. These cases present a characteristic clinical picture and have been called Ménière's "disease." Although many authors still object to the term "disease" because it would indicate that these cases

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form a pathogenic entity, for which proof is still lacking, lately there is a tendency to use this term instead of syndrome" or "symptom complex."

Autopsy reports of the condition in question were unknown until recently. In Ménière's original case of more than 80 years ago, the labyrinth was found to be filled with blood. On the basis of these macroscopical findings, it was believed for many years that the syndrome is caused by a hemorrhage into the inner ear. This opinion became incompatible with gradually accumulating evidence concerning the pathogenesis of the disease.

In 1938, two cases of Ménière's disease were reported by Hallpike and Cairns in which a considerable dilatation of certain parts of the endolymphatic system of the inner ear was the outstanding pathological change. Since that time, 12 more cases have been reported and the findings were strikingly similar.

Nine among the fourteen known cases showed unilateral, and five bilateral involvement. The cochlear duct in all of them was dilated, the saccule in most of them, the utricle in many, but the semicircular canals in none. The differences in the degree of dilatation are usually explained by the differences in the thickness of the walls of the structures concerned. In several cases a herniation of the saccule into the inner extremity of the external semicircular canals was observed; in others the utricle was seen protruding into the perilymphatic space of one or several semicircular canals. The end-organs, the organ of Corti as well as the macula and crista, did not show definite pathological changes. In some of the cases degenerative changes were present in the cells of the spiral ganglion in the basal coil. They were evidently not characteristic for Ménière's disease but identical with those observed in cases of "gradual high tone loss" (Crowe, Guild and Polvogt).

The dilatation of the endolymphatic system is evidently due to an increased endolymphatic pressure. The absence of changes in the perilymphatic space leads to the conclusion that the cause for this increase in pressure must be located within the endolymphatic system itself. The complete absence of signs of inflammation precludes the possibility of inter-

preting the changes as inflammatory in nature; but beyond that, the histological findings fail to give any hint as to the mechanism by which the changes are brought about.

According to Guild, the endolymph is produced in the stria vascularis. The resorption takes place in a certain part of the endolymphatic sac into the capillaries of the loose perisaccular tissue; therefore, the dilatation of the endolymphatic system could be due either to an overproduction or a diminished resorption of the endolymph or to a combination of both of these factors.

Changes in the secretory activity of the stria vascularis are primarily functional disturbances and cannot be expected to manifest themselves, at least not in the later stages, in marked morphological changes.

In most but not in all the reported cases a fibrosis of the loose vascular connective tissue which normally surrounds the resorptive area of the endolymphatic sac was seen. This has been regarded as morphological evidence of a disturbance of the resorptive mechanism; however, the same changes are sometimes also found in normal temporal bones. They probably represent an anatomical variation which, because of retardation of the resorption of the endolymph, may be a predisposing factor in causing dilatation.

Clinical evidence, such as therapeutical response to certain drugs, lead many authors to the belief that the attacks are the result of circulatory disturbances in the labyrinthine vessels which cause an over-production of endolymph with an increase of the endolymphatic pressure. It was noticed that the mechanism of the attacks was evidently not the same in all cases (Atkinson). In some of them a primary vasoconstriction, followed by a vasodilatation, could have caused the attacks; in other less frequent cases a primary vasodilatation with increased capillary permeability, due either to angioneurotic edema or allergy, a disturbance in the water balance, or the electrolyte metabolism.

Many authors feel that it is impossible to draw such a sharp distinction between the cases supposedly caused by primary vasoconstriction and those with primary vasodilatation. In the majority of cases the etiology of the angio-

neurotic disturbances of the labyrinthine vessels remains entirely unknown.

The assumption that cerebral arteriosclerosis is the most frequent etiologic factor (Brunner) is still without anatomical confirmation. I would rather think that temporary disturbances of the blood supply on an arteriosclerotic basis might cause attacks of dizziness without producing a labyrinthine hydrops; but these cases would not represent true Ménière's disease.

The explanation of the clinical signs and symptoms of Ménière's disease is still controversial.

According to Hallpike and Cairns, the attacks are due to a sudden rise of the endolymphatic pressure with "rapidly initiated bouts of asphyxia" of the vestibular end-organs. In the intervals between the attacks the pressure may still be higher than normal. This causes an anoxemia of the end-organs and a chronic state of lowered function of the labyrinth.

Lindsay opposes this conception and explains the attacks as being caused by the herniation of the utricle or saccule into the semicircular canals with subsequent distortion of the walls of the ampullae. The distortion interferes with the normal function of the cupula and explains both the attacks of vertigo and the depression of the caloric excitability in the later stages.

Until recently the interpretation of the vestibular findings in Ménière's disease was regarded as very difficult, and many authors believed that the findings lacked uniformity. It was claimed that in the initial stages the labyrinth is hyperexcitable and that when the disease progresses it gradually becomes hypoexcitable.

Recent investigations by Cawthorne, Fitz-Gerald and Hallpike, based upon the work of Vogel, de Kleyn and Versteegh and others, have to some extent clarified the situation.

Abnormal vestibular reactions are present in about 90 per cent of the cases. For their proper recognition, cold and hot caloric tests are necessary. The abnormal reactions appear in three forms: The most frequent finding, occurring in about one-half of the cases, is a decrease in the vestibular

irritability for hot and cold stimuli alike. This leads to a preponderance of the normal or less affected labyrinth. It is explained with a paresis of the affected lateral semicircular canal. In the second group, a so-called directional preponderance of the induced vestibular nystagmus (nystagmus-preparedness) is found. It is characterized by the fact that nystagmus to one side, no matter from which ear induced, shows longer duration than the nystagmus induced by the same stimulus to the opposite side. In directional preponderance to the left, *e.g.*, cold calorization of the right and hot calorization ot the left ear produces nystagmus of longer duration than hot calorization of the right and cold calorization of the left ear. Directional preponderance is explained with paresis of the utricle on the affected side. In some cases it is so marked that it leads to a transient or even permanent loss of the response to cold calorization on the opposite, unaffected ear. The third group shows a combination of one-sided preponderance with directional preponderance.

Previously it was more or less generally assumed that the vestibular symptoms which occur during the attacks are due to a stimulation of the affected labyrinth. Hallpike and co-workers, however, assume that the functional status of the diseased labyrinth is lowered in the entire course of the disease and particularly during the attacks. The vestibular symptoms are due to an imbalance resulting from a predominance of the healthy or less affected labyrinth. As a rule the more affected labyrinth shows the greater hearing loss but there are exceptions to this rule.

Hallpike's conception is steadily gaining followers but according to Clarke there is still room, in a proportion of cases, for a diagnosis of local hypersensitivity as the cause for the symptoms.

Hypersensitivity to caloric stimuli is not unfrequently found in patients with Ménièriform attacks due to cerebral arteriosclerosis.

There is no particular type of hearing loss which could be regarded as characteristic of Ménière's disease. In about half the cases a more uniform involvement of the entire tone range is found; in others there is a marked loss for the high tones, and in still another group a combination of uniform

involvement with high tone loss. In advanced cases the hearing loss may become very marked, but only in rare instances is it complete.

Intermittent diplacusis binauralis dysharmonica, a disturbance in which the same tone is heard at a different pitch in both ears, is a frequent finding.

The wide fluctuations in the threshold, particularly in the lower and middle range, in not too far advanced cases indicate that the hearing loss must largely be due to reversible changes. Lindsay's explanation that auditory disturbances are caused by distortion of the saccule and the membrane of Reissner which interferes with the sound transmission in the column of fluid in the cochlea, seems reasonable.

In many cases the tinnitus is evidently caused by irritative changes in the nerve endings due to the increased endolymphatic pressure; but this assumption does not fully explain the mechanism of the tinnitus, because it may persist even after complete section of the VIIIth nerve. This indicates that, at least in these instances, it may due to retrolabyrinthine changes.

No matter what the final explanation of the clinical picture may be, the fact remains that in all cases examined, convincing evidence of an increased endolymphatic pressure was found. The tendency of the disease to spontaneous remissions, which sometimes last years, must always be remembered when one attempts to evaluate certain therapeutic measures used in this condition. This is absolutely necessary to avoid undue optimism concerning results of certain therapy.

The purpose of conservative treatment is either symptomatic, aims at sedation and consists of the use of phenobarbital, bromides, bedrest, etc., or tries to regulate the intralabyrinthine fluid exchange. Nicotinic acid (Harris and Moore) and histamine are used to influence the vasomotor mechanism presumably controlling the secretion of the endolymph. In my experience, nicotinic acid worked quite well in a number of cases in which vasoconstriction was assumed to be the cause of the attacks. The main value of histamine application, according to Horton, lies in its effectiveness in controlling the acute symptoms of the disease. Atkinson uses it

only in patients with a positive intradermal test for histamine, indicative, in his opinion, of the primary vasodilatory nature of the attacks. He reports good results in these cases with gradual subcutaneous desensitization to histamine. According to Horton, however, it is not possible to distinguish between histamine-sensitive and histamine-insensitive cases. My own experience with gradual desensitization has not been favorable in regard to permanent cures. An attempt at influencing the vasomotor mechanism with intravenous injections of a 50 per cent solution of magnesium sulfate has met with success in some cases.

A reduction of the amount of the intralabyrinthine fluids is attempted by Furstenberg's diet, by the limitation of the intake of fluids and sodium chloride, or the intake of potassium chloride and similar measures. These drugs are successful in some cases.

Focal infection, particularly infected tonsils, sinuses or teeth, diseases of the liver and gall bladder are frequently regarded as important etiologic factors. In my own experience, which concurs with that of several other authors, this importance has been greatly over-estimated. The operative eradication of the supposed foci, if they are present at all, is not apt to effect permanent cures.

Tubar obstruction is another condition the importance of which has been greatly over-estimated. Together with several other authors, I have rarely encountered tubar occlusion in Ménière's disease. It would be extremely difficult to understand how such an occlusion could produce an endolymphatic distention. Only in those cases of true Ménière's disease in which a tubar occlusion is coincidentally present could tubar inflation or bouginage be helpful. It is conceivable that in these cases the distended endolymphatic spaces are very sensitive to an inward displacement of the stapes resulting from the Eustachian obstruction. This condition could be dramatically relieved by catheterization (Hallpike and Cairns).

Operative measures become necessary in a small group of cases only and should not be considered unless all conservative measures have failed.

Operations are performed on the acoustic nerve and on the labyrinth.

Intracranial division of the vestibular nerve (Dandy) interrupts the transmission of the impulses from the vestibular end-organs to the centers in the brain. It is a purely palliative measure. In successful cases it completely eliminates the dizziness, but the endolymphatic pressure remains unchanged, and the cause for the attacks is not eliminated. Probably the attacks continue, but because of the division of the nerve, they do not produce dizziness. The progress of the deafness and the tinnitus are not influenced or stopped. In unsuccessfully operated cases, the attacks may persist because of incomplete division of the vestibular portion, or the hearing may become diminished due to injury to the cochlear portion.

The recognition of the fact that the membranous labyrinth in Ménière's disease is distended as the result of increased endolymphatic pressure and the marked diminution of the danger of postoperative infection through the use of chemotherapy has lately stimulated interest in operative procedures on the labyrinth.

In the small group of cases with complete loss of useful hearing a destruction of the entire membranous labyrinth is brought about by injection of dehydrated alcohol through an opening in the lateral semicircular canal (Mollison, Mill) or without opening the mastoid, through the stapes footplate into the vestibule (Wright) or through the promontory into the basal cochlear turn (Berggren).

Other operations aim at selective destruction of the vestibular part by introduction of a coagulation electrode into the superior vertical canal (Putnam) or through the lateral canal into the vestibule (Day). The impossibility of an exact control of the extent of the coagulation explains the varying results obtained with this method with regard to the preservation of hearing.

Destruction of the utricle with a small dental excavator (Goodyear) resulted in disappearance of the attacks, but with complete loss of hearing.

Decompression of the labyrinth has been tried by Hautant and others. Lempert opens the perilymphatic space by creating a fenestra in the surgical dome of the vestibule; in addition, in cases without useful hearing, the stapes is extracted.

In cases with useful hearing the membranous endosteum of the scala tympani of the basal cochlear turn is exposed by creating a window in the promontory.

A rational approach to the problem is the opening of the endolymphatic sac as recommended by Portmann. By reducing the endolymphatic pressure it eliminates the attacks of dizziness and tends to restore the original condition of the entire endolymphatic system. In early cases the hearing is expected to improve; in others, to remain at the preoperative level. The cause for the attacks is not eliminated by this method, but as long as the opening in the endolymphatic sac is patent, the endolymphatic pressure will hardly increase during the attacks and only slight, if any, clinical manifestations, therefore, ensue. Because it is sometimes very difficult or even impossible to be sure that the sac is actually opened, Woodman suggests to tear the endolymphatic duct where it leaves the bone and enters the dura. This is achieved by lifting the dura from the posterior surface of the petrous pyramid towards the internal auditory meatus. Unfortunately, the results obtained by me in three cases and by Cawthorne in two cases did not justify our expectations.

According to Cawthorne the vestibular function can be abolished by opening the endolymphatic space. He advocates exposure of the membranous lateral semicircular canal and excision of a small piece of it. He reports encouraging results in 32 cases. The tinnitus was improved in about half of the cases.

Only further observations over a prolonged period of time will decide which method will be the final answer to the problem; however, it seems rather certain to me that operations on the labyrinth, as the more physiological approach and the less risky procedure, will eventually replace intracranial division of the nerve.

LITERATURE.

Atkinson, M. D.: *Jour. A. M. A.*, 116:1753, 1941.

Atkinson, M. D.: *N. Y. State Med Jour.*, 44:489, 1944.

Bergren, E.: *Acta Otolaryngol.*, 27:626, 1939.

Brunner, H.: *Arch. Otolaryngol.*, 40:38, 1944.

CAWTHORNE, T. E.; FITZ-GERALD, G., and HALLPIKE, C. S.: *Brain*, 65:138-161, 1942.

CAWTHORNE, T. E., and HALLPIKE, C. S.: *Proc. Roy. Soc. Med.*, 36:533, 1943.

CLARKE, T. A.: *Proc. Roy. Soc. Med.*, 36:546, 1943.

CROWE, S. J.; GUILD, S. R., and POLVOGT, L. M.: *Bull. Johns Hopkins Hosp.*, 54:315, 1934.

DANDY, W. E.: *Arch. Surg.*, 16:1127, 1928.

DAY, K. M.: THE LARYNGOSCOPE, 53:617, 1943.

DE KLEYN, A., and VERSTEEGH, C.: *Dtsch. Ztschr. f. Nervenheilk.*, 132: 257, 1933.

FURSTENBERG, A. C.; LASHMET, F. H., and LATHROP, F.: *Ann. Otol., Rhinol. and Laryngol.*, 43:1035, 1934.

GOODYEAR, H. M.: THE LARYNGOSCOPE, 53:743, 1943.

GUILD, S. R.: *Am. Jour. Anat.*, 39:57, 1927.

HALLPIKE, C. S., and CAIRNS, H.: *Jour. Laryngol.*, 53:625, 1938.

HALLPIKE, C. S., and WRIGHT, A. J.: *Jour. Laryngol.*, 55:59, 1940.

HARRIS, H. E., and MOORE, P. M.: *Med. Clin. N. Am.*, 24:285, 1940.

HAUTANT, A.: *Ann. des mal. de l'oreille et du larynx*, 45:924, 1926.

HORTON, B. P.: *Surg., Gynec. and Obst.*, 72:417, 1941.

HORTON, B. P.: *Arch. Otolaryngol.*, 40:330, 1944.

LEMPERT, J.: Personal communication.

LINDSAY, J. R.: *Arch. Otolaryngol.*, 35:853, 1942.

LINDSAY, J. R.: *Arch. Otolaryngol.*, 39:313, 1944.

MENIERE, P.: *Gaz. med. Paris*, 1861:585.

MILL, W. A.: *St. Thom. Hosp. Rep.*, 1:192, 1936.

MOLLISON, W. M.: *Guy's Hosp. Rep.*, 85:361, 1935.

PORTMANN, G.: *Jour. Laryngol.*, 42:809, 1927.

PUTNAM, T. J.: *Arch. Otolaryngol.*, 27:161, 1938.

VOGEL, K.: *Ztschr. f. Hals., Nasen. u. Ohrenheilk.*, 23:39, 1929.

WOODMAN, E. M.: *Proc. Roy Soc. Med.*, 32:1642, 1939.

WRIGHT, A. J.: *Jour. Laryngol.*, 57:120, 1942.

CASUAL RELATIONSHIP OF LYMPHOID TISSUE ABOUT EUSTACHIAN TUBES AND EAR PATHOLOGY. CASE REPORTS.*

EARL E. BAKER, M.D. (by invitation),
New York, N. Y.

The presence of lymphoid tissue about the Eustachian tube and its relation to ear, nose and throat pathology has for many years held considerable interest for our specialty. The indifferent results following a well done submucous resection, the complaint in some cases that "I have as many or more colds" following a tonsillectomy, and the slow convalescence and wet ear following a well done simple or radical mastoidectomy, are common complaints.

The results obtained in the careful removal of this tissue have prompted me to present briefly some of my experiences. To better portray the lymphoid tissue status, drawings of four posterior rhinoscopic images as seen by the laryngeal mirror were made, and for descriptive purposes I have named them as follows:

Type 1 designates those cases where there is no demonstrable lymphoid tissue about the Eustachian tube. *Type 2*, cases with the minimal amount of demonstrable lymphoid tissue about the tubes. *Type 3* shows a moderate amount of this tissue about the tubes and *Type 4* is characterized by considerable lymphoid tissue, occasionally the presence of adhesion bands and the narrowing of the orifice of the Eustachian tubes.

Case 1: A. R., 9 years old, with history of intermittent pain in the right ear for one week following a cold of five weeks' duration. Since birth he had had frequent colds with fever, stuffy nose and postnasal drip. He also had frequent attacks of tonsillitis and tender cervical glands; he had mumps, whooping cough and four attacks of acute otitis media (right). His tonsils and adenoids had been removed 10 months previously, with no relief of symptoms.

Examination: The head cold was resolving but he had an acute right ear. The nasal space was adequate, the tonsils had been removed but no attempt to examine the nasopharynx was made. He was taken to the

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hospital where a myringotomy under general anesthesia was done. He had a profuse bloody purulent discharge (hemolytic streptococcus culture) for three days, and some sagging of the posterior superior canal wall was noted on the third day. The child appeared sick, and a general medical examination including X-ray of chest was negative.

Suspecting the presence of lymphoid tissue about the Eustachian tube, he was anesthetized again and by digital manipulation, above and posterior to the tube, some lymphoid tissue was crushed away. This tissue was also removed from around the other tube, and from then on his improvement was marked and steady, so that on the fifth day the ear was dry. There was definite improvement in the status of his colds for a period of seven months, which has continued to the present time. Present examination, however, shows a tab of tonsil tissue in the upper pole of the right tonsil and some lymphoid tissue in the nasopharynx. He was classified as Type 2.

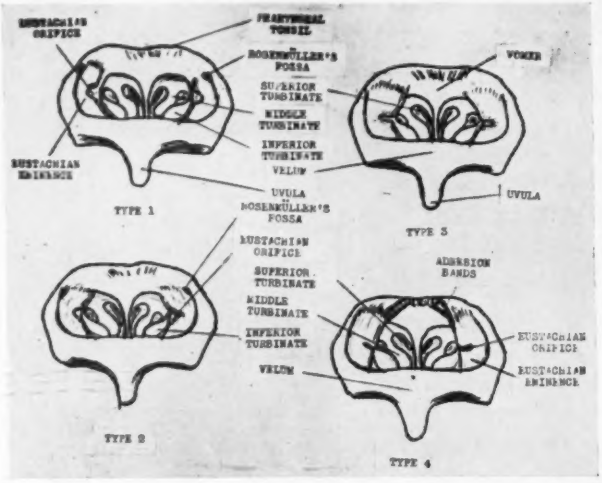

Fig. 1.

Case 2: L. B., male, 7 years old, has a history of three simple mastoidectomies and eight incisions of postauricular abscesses (all of the left ear). His tonsils and adenoids have also been removed. The last incision for posterior-auricular abscess was done in July, 1944, at which time a tooth was removed. This necessitated a prolonged stay in the hospital. Later he developed another acute ear. X-rays of the mastoid at this time showed sclerotic changes in the antral region with no cellular definition except some zygomatic cells.

The local findings of this otherwise healthy child, in October, 1944, were as follows: Tonsils out, adenoid tag and Type 4 nasopharynx. The left ear has a central perforation involving 40 per cent of the lower part of the drum. X-rays of the sinuses showed a marked edema 4+ ethmoids, 3+ antra, 2+ sphenoid, and adenoid tissue in the nasopharynx. Allergy tests for inhalants and food were negative. The Wassermann test was negative. The hearing test of the right ear is 10 db and in the left ear, 20 db. loss in the speech range.

Operation: Nov. 4, 1944, an adenoidectomy and removal of lymphoid tissue about the tube was done. The findings were a Type 4 with adenoid cuff high in the nasopharynx. There are fewer colds to date and the ear is dry.

Case 3: T. O., 13 years old; girl with a history of frequent colds followed by discharging ears for six years. Past History: A double mastoid (right modified radical and a left simple) was done in 1934 for chronic discharging ears. This resulted in quite dry ears for a few years, and large central perforations were reduced from 75 per cent of each drum to 40 per cent. Tonsillectomy and adenoidectomy and later a partial submucous in 1935.

Examination reveals a well developed female. Type 4 nasopharynx with a very small adenoid tag in the right side continuous with the tube. The tonsils were out. X-rays of sinuses revealed marked edema 2+ ethmoids, 2+ right and 1+ left antra, and 1+ frontal.

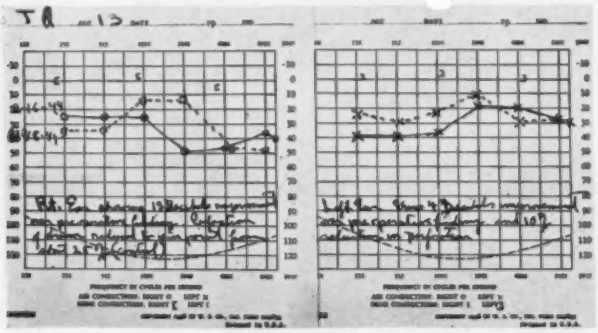

Fig 2. Case 3.

Operation: In February, 1944, the adenoid tag and the tissue about the tubes were removed. The child today has a dry right ear with a much reduced perforation and similar findings in the left ear. There are fewer colds. The speech range hearing loss is 18.5 db. in the right ear and 16 db. in the left ear. This represents a hearing improvement of 13 db. in the right ear and 4 db. in the left ear over the preoperative findings. There has been a return of the lymphoid tissue in this case to a Type 3 nasopharynx. Radiation may be used.

Case 4: R. B., male, 8 years old, from South Carolina, presented himself with a history of sneezing, frequent colds, running nose for three years. Whooping cough and measles when 2 years old. His tonsils and adenoids were removed 18 months previously with no improvement of the symptoms. No history of ear trouble. The X-rays in June, 1944, revealed 2+ ethmoids, 1+ antra and sphenoid.

Operation: In August, 1944, a double antrotomy was done. His nasopharynx was classified as Type 1. His symptoms, which had improved some, recurred when he returned to South Carolina. He was advised to live here, which he has since Oct. 15 and, with increased dosage of cod liver oil and orange juice, has enjoyed good health.

Case 5: H. G, actor, 42 years old, presented himself with a complaint of posterior nasal drip, stuffiness in the nose and tinnitus in right ear of 10 years' duration. A tight feeling in right ear and head of five years. Allergy tests were negative. A tonsillectomy five years ago and a sub-

mucous three years ago in another hospital gave no relief from his symptoms. Psoriasis since 12 years of age.

Examination: The right ear canal is congested but not narrowed, and the drum is of a tubal catarrhal type. Inflation is 100 per cent and the hearing is good. There is free nasal breathing space and the mucous membrane is congested and covered with a small amount of sticky mucus. The tonsils are out. The basal metabolism, —6; blood pressure, 110/75; Wassermann, negative; blood count, normal; and nasopharynx is Type 3. X-rays of the nasal sinuses were negative. He was treated with nose drops, packs, vitamins and diet for 18 months with no relief.

Operation: On Nov. 4, 1944, under general anesthesia. Lymphoid tissue was crushed away from the tubes, and the whole adenoid area of the nasopharynx was massaged, crushing out an occasional patch of lymphoid tissue.

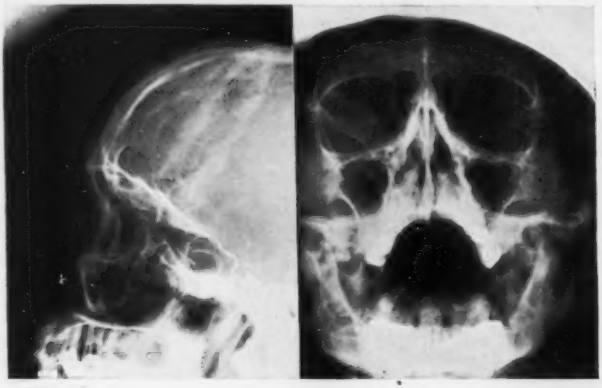

Fig. 3. Case 5.

Result: His chronic cold has disappeared, tightness of his right ear has decreased 75 per cent. He uses one handkerchief now instead of three. Sight is better, hearing is sharper, no change in tinnitus. He contracted a cold three weeks ago and, as he described it, "it snapped away the next day."

Summary: Five cases are reported. In Case 1 the Type 2 nasopharynx was demonstrable by palpation. In Case 2 an important focus of infection including adenoid tag was removed. In Case 3 there was not only an improvement in health but also in the perforations of the eardrums and hearing. In Case 4 a Type 1 nasopharynx was found at operation and no history of ear trouble, and in Case 5 a primary focus was present.

Operation: The usual adenoidectomy, if indicated, is done with the La Force adenoidectome of proper size, a few scoops in the center, handle midway between the teeth, following

first a preliminary palpation examination, crushing the adenoid toward the midline from the tubes, and a final palpation and inspection examination with elevator. Nearly all nose and throat men that I have consulted stop here. This procedure may be followed, if indications warrant, with the passing of the forefinger to the pharynx, then to the nasal pharynx identifying and hugging the tube and with moderate pressure readily breaking away any lymphoid tissue and bands about the tube. Most of the tissue will be found superiorly and posteriorly to it. Although there may be some connective tissue changes in the lymphoid tissue, it is rarely necessary to use a curette, and we caution against its use, because of the danger of injury to the Eustachian tubes. The operation can readily be done under local anesthesia, especially where tubal tonsils only are present, and the best time is when a tonsillectomy is done.

Conclusion: These cases certainly stress the importance of considering lymphoid tissue about the Eustachian tubes as well as the smallest adenoid tag as a possible foci of infection, especially if ear pathology is present. We are all aware of the great work that Dr. Crowe is doing with radiation, where a conductive obstruction to hearing is present, and also know that the X-ray will remove lymphoid tissue in this area. A complete checkup of X-rays of sinuses, allergy, hygienic, dietetic, medical and vitamin study should be done, if indicated. In conclusion, the results obtained in 75 cases done to date have been very good and warrant future consideration.

150 East 90th Street.

RHINITIS VASOMOTORIA DUE TO IMBALANCE OF THE ENDOCRINE GLANDS.

GEORGE R. LAUB, M.D.,
Columbia, S. Car.

The symptoms of vasomotor rhinitis are well known; however, the cause of this peculiar syndrome and its treatment are still in the stage of discussion. Hay fever, which is definitely due to certain allergies and is seasonal in its course, has to be treated by desensitization of the patient. This question seems to be solved.

This paper is intended to throw some light on those forms of vasomotor rhinitis which are independent of seasons, although the complaints and the findings are very similar to hay fever: sneezing attacks, mucous discharge from the nose, bluish color of the mucous membranes, which are swollen, and blocked nasal breathing. In these cases, the history of a temporary blockage of nasal breathing is characteristic in differentiation of a permanent blockage due to anatomic conditions such as deviation of the septum, etc. It is interesting to note that when the patient is reclining the inability to breathe through one side of the nose may change by turning the head to the other side.

In consulting the textbooks, we find that vasomotor rhinitis is called a synonym for perennial hay fever or allergic rhinitis; however, the same textbooks state that many types are nonallergic and may be due to some endocrine imbalance.[1] In addition to allergy, another textbook[11] suggests hyperplastic rhinitis, thermic stimuli, deficiency of blood calcium, reflex nasal neurosis, intestinal toxemia and endocrine dysfunction, especially those of the thyroid (hyperthyroidism) and the gonads in association with adolescence, menstruation, gestation and the climacterium, as the causes. In the discussion, however, this book also gives the most prominent place to the allergic forms of this disease. The bibliography about

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endocrine causes is so extensive that it is possible to quote only a few papers. Northrup[12] discusses four cases in which he finds a very acute hyperparathyroidism. He finds a remarkable similarity in the excretion of calcium through the kidneys, despite the different ages of the patients, who were 22, 25, 70 and 63 years of age. Calcium in the urine is 49, 49, 47 and 50. Liver function tests show the liver to be from 30 per cent to 50 per cent below normal in his patients. He does not state the kind of tests used.

Sonnenschein and Pearlman[13] found no deficiency of blood calcium in cases of hay fever, except in cases of hyperesthetic rhinitis. They discuss the value of calcium treatment as well as its action. They found no evidence that parathyroid feeding is of any value in man. They do not favor the use of any thyroid medication.

Willson-Pepper and Royle[16] report a very interesting case of a 36-year-old woman who for 18 months had complained of vasomotor rhinitis. All tests performed were slightly positive to mink, wheat, dog, cat, feathers, etc. Since the patient suffered at the same time of menorrhagias, the allergic treatment was postponed and the patient received progesterone. "After the first injection of progesterone, the nasal discharge and congestion immediately subsided. The relief was as unexpected as it was complete." Since they have but one case, they, of course, did not draw any general conclusions. Hoseason[8] makes the statement that "nasal turgescence is one of the 'specific skin responses' to increase the circulating sex hormone occurring at estrus." He calls this type of vasomotor rhinorrhea an "estrogenic rhinorrhea." Forman[6] discusses especially the thyroid gland and some of the other glands, *i.e.*, ovarian and pituitary, in relation to vasomotor rhinitis. Urbach[15] examined 379 patients with asthma and found that 145, or 38 per cent, also had vasomotor rhinitis. In this paper he analyzed 74 cases of vasomotor rhinitis without any history or evidence of asthma at the time of examination. In breaking down his material, he finds that 34, or 46 per cent, were men, and 40, or 54 per cent, were women. The majority of the men (53 per cent) came under observation during the fourth decade of life and most of the women during the third and fourth decades (30 per cent to 40 per cent, respectively). None of the patients was in the first decade and only

two were in the second decade of life. In 9 per cent of the cases the nasal condition first manifested itself in men in their seventies. Urbach noted that the incidence of asthma in the family history (19 per cent) was only slightly higher than the average for the population (8 per cent). "Strikingly few (21 per cent) of the patients reported allergic symptoms aside from migraine.

During 1935 to 1937, V. Koerbel and C. Wiethe[10] made some experiments with patients having vasomotor rhinitis, at the University Clinic for Ear, Nose and Throat, in Vienna, Austria, which later were continued by V. Koerbel together with the writer. At this time they used Abderhalden's reaction with interferometry for the different endocrine glands. The test was done in each case for total pituitary gland, for the anterior and posterior lobes of the pituitary separately; thymus, thyroid, parathyroid, mammary, pancreas, adrenals, ovaries and testicles. Although these tests are far from perfect, they are a good indication as to which glands are disturbed in the sense of a hyper- or hypofunction. If the thyroid gland was involved, they checked also B. M. R. and in cases of the pituitary gland, the B. M. R. was repeated one-half hour after intake of 50 gm.of protein. Normally, the B. M. R. increases about 30 per cent; in most of our cases we found no increase. Koerbel and Wiethe examined 88 cases (65 women and 23 men) for different reasons; only 27 of their cases (15 women and 12 men) received treatment. More than 90 per cent of them, men as well as women, showed an increased Abderhalden reaction to the thyroid gland, total pituitary gland and gonades. It is remarkable that in more than half of their cases the B. M. R. was normal despite a positive Abderhalden reaction to thyroid gland and typical clinical symptoms of hyperthyroidism. Therapeutically, combined treatment of pituitary, thyroid and testical or ovarian extract, respectively, was used with good results. Although we have the records of further experiments, details are not given, since it was not possible to follow up these cases for a period longer than one year.

Since being in the United States, I have clinically observed quite a few cases without being able to continue the above-mentioned tests. Women are receiving much more attention in the literature than men. We read about the disturbances

of the nose due to menstruation and climacterium, but there is little mention of the "male climacterium." W. O. Thompson[14] characterizes it by the symptoms of hot flushes, weakness, nervousness, irritability and emotional instability, sometimes associated with excessive worry and morbid fears. Sexual and bodily activities are diminished. C. H. Boswell's[3] findings are of similar nature. C. W. Dunn[4] reports the symptoms of the climacteric man but also explains the necessity of endocrine treatment at other age groups. J. Bauer[2] denies the existence of a male climacteric period because there is "no definite age the testicles stop functioning." He also denies vasomotor crisis and sudden attacks of perspiration as occur in women during menopause. From the rhinologist's standpoint our interest is concentrated in the respiratory organs. None of the papers mentions the complaints in regard to this tract, which are sometimes not only annoying but occasionally produce the clinical picture of a very sick person. These men complain about temporary blockage of the nasal respiration; sometimes one side of the nose is affected, sometimes the other one in the same patient. We find sneezing attacks and a great amount of watery mucous discharge of the nose. There are two other periods in the life span of a man besides the climacterium, when the symptoms may appear, *i.e.*, at adolescence and when he reaches the seventies. It is widely known that climacterial complaints of women will be improved by giving ovarian extract, and their vasomotor rhinitis can be greatly relieved. The same method used in male patients gives even more remarkable improvements. Testicle extract, five capon units, one injection a week, will improve nasal condition in a very short time; however, as Dunn points out, we have to be careful not to give too much, because of the danger of hypertrophy of the prostate gland.

It is very hard to understand the mechanism of the endocrine glands in relation to the nose. About 60 years ago doctors tried to influence the glands by topical application of drugs to the mucous membrane of the nose. The relation between these two organs was known at that time. The nature of it is unknown even today. Some authors believe that calcium, like pyramidon, makes the capillaries of the mucous membranes less permeable for transudation.[5] Others believe that the calcium effect is caused by a disturbed calcium level in the body due to dysfunction of the parathyroid.

The parasympathetic nervous system certainly has some effect on the nose; it may be primary in effect on the endocrine gland, secondary on the mucous membrane; it may be primarily a disturbance of the endocrine glands which influence the parasympathetic nervous system with the nose as effect organ. It is not yet clear which is the correct assumption.

It is recorded in the literature,[7] and observed by all practitioners, that some people get attacks of vasomotor rhinitis when smoking, or, if a nonsmoker, when entering a smoke-filled room. Nicotine, of course, affects the synapsis of the autonomic nervous system. Sudden temperature changes, like getting up from a warm bed and washing the face with cold water, produces in many cases a sneezing attack. This probably is also a nervous irritation, and I do not believe that this could be called a physical allergy.

We find the same nasal symptoms in men as in women of the same age group, at adolescence, especially several months before and after the onset of the menstrual periods and at the time of the climacterium. During the period of gestation, which is to be considered as a physiologic one, we find many cases of endocrine glandular upset or "maladjustment" which produce nasal symptoms as well as laryngitis gravidarum, etc.

Discussion on the other hormonal glands should be short since much more is generally known about their relation to the nose. We differentiated a hyperthyroidism and a hypothyroidism, two conditions, which very seldom occur in their classical form. In Vienna we were taught that we have to deal mostly with mixed forms; some parts of the gland are hypoactive, while some of the parts of the same gland are hyperactive. We may find a dry skin, with coarseness of the hair and, on the other hand, some degree of nervousness, tachycardia and slightly increased B. M. R. We may see cases with moist skin, loss of hair, constipation and decreased B. M. R. For this reason we were asked to talk of a "dysfunction of the thyroid gland" rather than of hypo- or hyperthyroidism. These cases show very commonly the typical symptoms of vasomotor rhinitis. Disturbances of the pituitary gland are very hard to detect. This gland is the "heart" of the endocrine system, and stays in direct relation to the thyroid, gonades, adrenals, mammary, pancreas and thy-

mus glands. A few of the hormones are commercially available, but still much research work must be done to complete our knowledge.

The best way to detect the causative gland in cases of vasomotor rhinitis is a good history with special inquiries regarding the endocrine setup of the patient as well as the allergic history. The next step is a B. M. R. repeated after intake of protein. Since such complicated laboratory methods as the Abderhalden reaction are impossible to perform in the practice of medicine, we have to rely on the symptoms and use a trial treatment, when we definitely suspect a certain gland. We will do no harm to give a woman aged 40 some ovarian extract and check the effect of a few treatments after a period of two months. The same thing is true of other glandular preparations. The dosage, in my opinion, should always be the lowest one which will give results. I use a larger dose to start treatment, when the diagnosis is established, and later decrease it to a small maintenance dose to keep up the good results. To illustrate this method of treatment a few typical cases are reported:

Case 1: D. C., a 48-year-old white man, had difficulty in breathing through the nose for about three years. He was advised by physicians to have the "polyps" removed. He came to me for this purpose, but on shrinking the mucous membrane no polyps could be found. A careful endocrinal history revealed symptoms as described above as "male climacterium." He received 10 mg. Testosteron propionate three times a week, later only once a week, for a month. Afterwards only one injection monthly. After two weeks his nose breathing was free and he has had no difficulties since. This patient is under observation since May, 1944.

Case 2: Mrs. J. F., 60-year-old white woman, came with the complaint of having had a watery discharge every morning for several years, and itching in her ears. She had a septum operation many years ago—no difficulties in breathing. Various nose drops gave no relief. She received 1 mg. of estrogenic hormone once a week from me, and after four weeks the discharge and the itching of the ears practically ceased. She now receives 1 mg. every three weeks. She has been under my care since July, 1944.

Case 3: Mrs. F. B., 61-year-old white woman, suffered from asthma especially in the fall and spring since childhood. For about 10 years she had "sinus trouble" especially at every change of temperature. For this reason she spent some time each spring and fall in the mountains or at the seaside. Menarche at the age of 16 with regular periods and menopause at 50. She had two children and one ectopic pregnancy at which time her tubes were tied (37 years of age). She complained of loss of hair, moist skin, blockage of nose breathing, one side at a time. A few years ago allergic tests gave a positive reaction for house dust and Irish potatoes. Desensitization was unsuccessful. The examination revealed a bluish red nasal mucous membrane. B. M. R. of +24 per cent. Her weight is 91 pounds in spite of a good appetite. The patient

received some iodine by mouth and improved considerably. Since October, 1943, she has had only occasional light attacks of asthma and is free of nasal symptoms.

Case 4: F. D., a 44-year-old white man, suffered from asthma and hay fever. His complaints were fullness of the head, especially the right side, water-like mucus discharge independent of the season, attacks of sneezing about 50 times in succession. In 1935 he went to Duke University for examination. There he was told that he was allergic to all flowers and trees—quite a shock to him because he is a florist. For nine years he did not enter his flower shop and conducted his business by telephone. Nevertheless, the nasal symptoms did not disappear, although the asthma improved. In July, 1944, he was given a small dose of calcium by mouth and 20 mg. of testosterone proprionate once a week. After 11 weeks he had no breathing difficulties and the sneezing attacks stopped within five weeks after beginning treatment. Later he received only 10 mg. testosterone proprionate weekly, which was discontinued in October, 1944, after only three months' treatment. This patient felt so well that he did not return for further treatment. He telephoned and told me that he was working two to three hours a day in his flower shop, without asthma or hayfever attacks.

This is a very unusual case and it is not my intention to make a statement to the effect that endocrine treatment is the cure for an allergic case like this, but it may eliminate a factor which contributes to the allergic symptoms.

Summary: Very careful histories and endocrinological examination of cases with vasomotor rhinitis were undertaken. It was possible to show definite relations between the different hormonal glands and the mucous membrane of the nose. The treatment is an attempt to restore the glands to normal functions. If such trials are successful the sufferer of vasomotor rhinitis can be greatly relieved or cured in a relatively short time without the use of local nasal treatment with nose drops.

BIBLIOGRAPHY.

1. Ballenger, W. L., and Ballenger, H. C.: Diseases of Nose, Throat and Ear. Lea and Febiger, Philadelphia, 1943, p. 95.

2. Bauer, J.: *Jour. A. M. A.*, 126:914, Dec. 2, 1944.

3. Boswell, C. H.: *Ill. Med. Jour.*, 82:4:280.

4. Dunn, C. W.: *Med. Clin. N. Am.*, 26:6:1867-1895, Nov., 1942.

5. Eppinger, H.: Personal communication.

6. Forman, J.: *Ann. Otol., Rhinol. and Laryngol.*, 43:279, Mar., 1934.

7. Hollander, A. R.: Office Treatment of Nose, Throat and Ear. Year Book Publishers, Chicago, 1943.

8. Hoseason, A. S.: *Brit. Med. Jour.*, 4056:703, Oct., 1938.

9. King, E., and King, J. H.: *Arch. Otol.*, 37:645, May, 1943.

10. Koerbel, V., and Wiethe, C.: *Monatsschr. f. Ohrenheilk. and Laryngol.-Rhinol.*, p. 604, 1936.

11. Lederer, F. L.: Diseases of the Ear, Nose and Throat. F. A. Davis and Co., 4th Ed., Philadelphia, 1943, p. 370.

12. Northrup, F. A.: *Clin. Med. and Surg.*, 41:439, Sept., 1934.

13. Sonnenschein, R., and Pearlman, S.: *Jour. A. M. A.*, 83:1973, Dec. 20, 1924.

14. Thompson, W. O.: *Med. Clin. N. Am.*, p. 84, 1940.

15. Urbach, E.: *Arch. Otolaryngol.*, 33:982, June, 1941.

16. Willson-Pepper and Royle, H.: *Brit. Med. Jour.*, 1:974, May, 1939.

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SOME INDUSTRIAL HAZARDS IN OTOLARYNGOLOGY.*

SAMUEL L. FOX, M.D.,
Baltimore, Md.

In addition to the many and varied injuries resulting from combat, there is an ever-increasing number of accidents now occurring from the greatly heightened industrial activity at home.

All industrial surgeons and otolaryngologists are familiar with the usual variety of lacerations and avulsions which may involve the ear and nose. The time-honored advice, "to save all tissue possible in doing the repair," still obtains. The advent of sulfonamide therapy, both locally and orally, has lessened the complication of infection; however, it has not replaced the need for tetanus antitoxin prophylactically, a fact which is often forgotten, especially by otolaryngologists.

From the standpoint of plastic surgery, the use of sulfonamides locally in wounds has created a new problem. Sulfanilamide should be used in preference to sulfathiazol and sulfadiazine since the latter are almost insoluble and remain in the wound for prolonged periods of time, even weeks, causing a foreign body reaction with a resultant ugly scar. Even when sulfanilamide is employed, it should be applied sparingly, since its solubility is minimal, and all sulfonamides, when applied to a wound, stimulate serous discharge and local bleeding.

Many of the poor plastic results in cases of avulsed lacerations of the nose and ears are due to improper cleansing and suturing. The author never employs alcohol or tinctures in open wounds about the face or head, since the alcohol precipitates cell-protein, which then becomes a foreign body in the wound. The same principle is considered when placing catgut sutures: the finest possible catgut should be used, and the knots should be cut very short, so that the minimal amount will remain in the wound to be absorbed. Silk sutures are preferably placed at close intervals, using atraumatic

*From the Department of Otolaryngology of the University of Maryland School of Medicine.

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needles, alternating a deep and a superficial suture. The superficial ones are removed on the second day and the deeper ones on the fourth day. If allowed to remain longer, the small depressions made by the needle punctures will tend to remain permanently.

Burns from explosions make up another large group of cases. It is important to remember that orifices such as the nostrils and the external auditory meatuses must be kept patent. This is best accomplished by temporary packing with lubricated gauze or stent molds. It is important to remove all debris and dirt from these burns, and especially all particles of heavy metal or dye; otherwise there will be permanent discoloration and disfigurement. The surgeon should not hesitate to administer a general anesthetic in order to properly cleanse and debride burns of the face and head before applying a "fixative" such as tannic acid, gentian violet, sulfadiazine, or the newer compression bandages now being recommended. All of these methods produce anaerobic conditions in the wounds so that tetanus antitoxin should be administered to all patients; or a "booster dose" of tetanus toxoid should be administered to cases previously inoculated.

Unusual injuries have been seen among shipyard workers. One patient recently treated was injured while lying on his side, chipping paint, when a piece of hot slag from above fell into his ear canal, producing a second degree burn of the canal and drum with resultant marginal perforation and chronic otorrhea. A similar accident to another patient resulted in more superficial burns of the ear, and the patient exhibited a typical *myringitis bullosa* when he presented himself for treatment.

The author has seen two cases of acute toxic labyrinthitis among chemical workers. In the more recent case, the patient was a young adult who worked with arsenic (Paris green) in preparing an insecticide. He was subjected to extreme exposure for several hours while he repaired a mixing machine, and emerged with severe headache, "stuffy nose" and feeling of being ill. When first seen about 12 hours later, there were several areas of ulceration on the nasal septum, which had previously suffered a chemical perforation. Next day the patient developed a typical labyrinthitis of the left side with nystagmus to the right, nausea with

projectile vomiting, and inability to move his head or elevate it without suffering objective vertigo to the right.

Many cases of nasal allergy have been seen among war workers. After careful workup, some were diagnosed as being sensitive to dust. A number were found sensitive to the shellac used in radio manufacture, while others were sensitive to the special paints employed in airplane production. The only solution is to change the patient's occupation or his working environment, so as to avoid contact with the allergin. Nasal filters are of little value.

Acute laryngitis from exposure to chemical fumes has been seen rather frequently. Many foremen and instructors in noisy war plants have developed a similar chronic laryngitis due to the amount of shouting they must do to overcome the plant noises and make their instructions heard. Removal from the environment, vocal rest and the usual measures for laryngitis are indicated.

A number of cases of explosion deafness have been seen, in which the labyrinth was subjected to a sudden severe concussion, with resultant permanent nerve deafness of varying degree. Similar hearing losses have been seen following severe trauma to the head, with resultant labyrinthine concussion. In these cases the audiogram varies but always shows a rather profound loss of hearing for some or all of the tones, with a pattern typical of nerve deafness. The Rinne is likewise positive, and the bone conduction is shortened.

More important is the ever-increasing number of cases of chronic noise deafness ("acoustic trauma"), which are being seen almost daily. Here the patients complain first only of tinnitus following a day's work amidst *high tone* noises of over 85 or 90 db. intensity. Early audiograms reveal a loss for the 4,096 tone only, which progressively grows worse and then spreads to the adjacent tones. Proper insulation of the work room and adequate periods of rest after exposure to noise are essential for the prevention of this occupational deafness. Wearing properly fitted ear plugs is helpful. In spite of these measures, if a worker shows himself susceptible to noise deafness, the safest procedure is to change his working environment, otherwise he may suffer a severe and permanent hearing loss.

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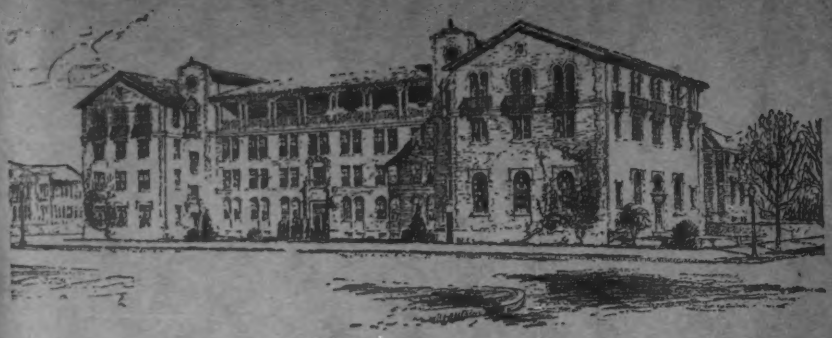

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